temperature in the Western and Northwestern States, and during the next few days the conditions which caused these rains extended eastward to the Atlantic coast and ended a heated term of unusual intensity and duration in the Lake region, the Ohio Valley, and Middle Atlantic States. During the 24th needed rain fell over a large area in the Central Western States.

August.—The month was characterized by general stagnation in the lower layers of the atmosphere. East of the Rocky Mountains and north of the Gulf States the weather was abnormally warm, the monthly mean temperature surpassing, in many instances, those registered in tropical countries. The skies were generally free from clouds, especially at night, and rainfall was deficient over large areas east of the Mississippi. In Nebraska, the Dakotas, Minnesota, northern Wisconsin, and portions of Iowa an abundance of rain fell. West of the Rocky Mountains temperature was below the seasonal average, and rainfall was also below normal. Drought prevailed in Arizona, portions of New Mexico, Colorado, and Wyoming.

There was a marked absence of violent local storms and destructive tornadoes, and the highs and lows, while following beaten paths, moved very slowly.

September.—Aside from the West Indian hurricane which partially destroyed Galveston, Tex., on the 8th, an account of which was given in the September REVIEW, there were few broad features of especial significance. Perhaps the most significant was the high pressure that prevailed on the middle and south Atlantic coasts and over Virginia, West Virginia, and the Ohio Valley. The weather east of the Rocky Mountains, at least, if not over the entire country, is controlled largely by the distribution of pressure over the Atlantic coast districts. When areas of high pressure persist over those districts areas of low pressure which develop in Alberta or over the northeastern Rocky Mountain slope and move southeastward into the Missouri Valley are forced to move thence a little east of north, passing over Minnesota and Lake Superior and thence eastward generally beyond the field of observation. The effect of the pressure distribution in such cases is to give heavy rains in the British Northwest, Minnesota, and the Lake Superior region, and high temperature with scant rains in the Mississippi Valley, the Lake region south of Lake Superior, and generally eastward to the Atlantic. The fall of rain in the South Atlantic States is also markedly deficient, while far to the westward in Oklahoma, Indian Territory, west Texas, and New Mexico the rainfall is abundant. These conditions prevailed, in great measure, during the current month.

The temperature was abnormally high in eastern districts until about the 12th. The rapid movement of the West Indian hurricane from Iowa to the Canadian Maritime Provinces, on the 11–12th, brought a cessation of the high temperatures that had prevailed almost continuously since the early part of August, yet the month, as a whole, will rank as a warm September.

October.—In many respects the weather of the month was typical of summer conditions. The circulation of the air was generally feeble, temperatures were above the seasonal averages, and the rainfall was abundant in the majority of districts. A number of areas of low pressure formed in the Plateau region or moved in from the north Pacific, only to dissipate in the upper Mississippi and Missouri valleys. It was eminently a month of inaction on the part of the lows. Two areas of high pressure of marked character moved across the country. The first appeared over the northern Plateau region on the morning of the 6th, moved to the middle Rocky Mountain region by the morning of the 7th and to the Mississippi Valley by the morning of the 8th. The second appeared north of Montana on the morning of the 15th, moved to the upper Mississippi Valley by the morning of the 16th and to the New England coast during the next twenty-four hours. This extremely rapid movement was doubtless due in part to the sudden development of an area of low pressure over eastern New England on the 16th.

The distinguishing characteristics of the month were (1) the sluggishness of the lows; (2) the persistence of areas of high pressure over New England and the Middle Atlantic States; (3) the high temperatures east of the Rocky Mountains and the prevalence of summer weather types.

November.—The weather of November, 1900, was rather stormy, in marked contrast to that of October, 1900. The area of high pressure over the eastern seaboard, which has been so marked a feature in the pressure distribution of the last four months, gave way early in the month and areas of high pressure began again to move in a southeasterly direction.

The temperature was generally above normal, except in the upper Mississippi Valley and in the extreme Northwest, where the average daily negative departure was from 3° to 6°. Heavy snows occurred in the northern Rocky Mountain districts during the 20th and 21st, but the snowfall elsewhere was comparatively light.

A series of tornadoes occurred in southeastern Arkansas, northern Mississippi, and western and middle Tennessee on the 20th, a special report of which appeared in the November REVIEW.

The distinguishing characteristics of the month were (1) the breaking up of the area of high pressure over the eastern seaboard, (2) a movement of the highs southeastward, and (3) the occurrence of severe tornadoes in the middle Mississippi Valley.

December.—The month of December, 1900, was not marked by any severe cold waves or by unusually stormy weather. Mean pressure was in excess of the normal over the central Rocky Mountain and Plateau regions, and also in eastern Tennessee, Georgia, the Carolinas, and Virginia. There were no marked cold waves in the eastern part of the country. West of the Mississippi and north of the thirty-fifth parallel temperature was generally in excess of the normal for the season. Over this same region precipitation was markedly deficient, except on the immediate coast of Washington, where there was an excess of 3 to 5 inches. The month as a whole was drier than usual, except along the immediate Gulf coast and from southern Alabama northeastward to the Carolinas. The chief characteristics were, therefore, (1) high pressure over the central Rocky Mountain and Plateau regions, (2) drought on the Pacific coast south of Washington and a general deficiency of rainfall over the major portion of the country east of the Rocky Mountains, (3) high temperatures and a marked deficiency in snowfall throughout the entire Rocky Mountain and Plateau regions.

GENERAL CLIMATIC CONDITIONS.

By Prof. ALFRED J. HENRY, Chief of Division of Meteorological Records.

ATMOSPHERIC PRESSURE.

The numerical values of annual mean pressures for 1900 are given in Tables I and II. The method of reduction to sea level in use during the year was the same as in former years, with the exception that an appropriate correction for variations in the force of gravity with latitude has been applied since January 1, 1899. In other respects the annual mean values are comparable with those of the preceding and other years in which Professor Hazen's method of reduction was used.

In addition to the table of reduced pressures, referred to in the preceding paragraph, a second table has been formed (Table III), in conformity with the custom of previous years, by reducing the actual pressures to sea level and standard gravity in accordance with the tables and methods of the International Meteorological Committee, as explained in the MONTHLY WEATHER REVIEW for 1895, Volume XXIII, pages 492–494. The reduced pressures so obtained appear in Table III and on Chart I. The data in the last column of Table III are the pressures at 10,000 feet above sea level, obtained by assuming a uniform decrement of temperature at the rate of 2° F. per 1,000 feet (0.37° C. per 100 meters), as in former annual summaries; the resulting isobars are shown on Chart II.

The distribution of mean pressure at sea level for 1900 is shown by the isobars on Chart I. The configuration of the isobars for 1900 differs very slightly from that of the previous year.

In the middle Mississippi Valley, lower Lake region, and thence eastward to the Atlantic coast pressure was above the normal, as in 1899. Along the Gulf coast and generally west of the Mississippi River pressure was below the normal as much as .04 to .05 inch in some places. In general, pressure was slightly lower in 1900 than in the preceding year.

TEMPERATURE.

The year as a whole was characterized by a number of periods of high temperature, the most notable one being that of midsummer in the Lake region, the Mississippi and Ohio valleys, and the eastern seaboard, not including New England and Florida. It is a rather remarkable fact that in all parts of the country, save in the extreme southwestern part of the Florida Peninsula, mean annual temperature was above the normal by amounts varying from a fraction of a degree on the Gulf coast to as many as 4° in the Dakotas. Maximum temperatures of 110° and over were recorded in eastern Montana and northern South Dakota. Maximum temperatures of 100° were recorded in eastern Pennslyvania, Maryland, the District of Columbia, and generally in the Piedmont Plateau. Maximum temperatures of 100° and over were also recorded in the lower Ohio Valley, the Gulf States, southern New Mexico, Arizona, southern California, northern Oregon, southern Idaho, southeastern Washington, and eastern Wyoming. The highest temperature registered at any Weather Bureau station was 112°. Minimum temperatures ranged from 38° below zero in northern Montana to 51° above zero at Key West, Fla., and 29° above at Corpus Christi, Tex. The line of zero temperature did not extend as far south as in the winter of 1898–99 by at least 200 miles.

PRECIPITATION.

The distribution of total annual precipitation is shown on Chart IV, the district departures by Table B. The year as a whole was one of abundant rainfall in the middle Mississippi Valley, eastern South Dakota, central and western Texas, the eastern Gulf States, and Maine. The rainfall was markedly deficient in southern New England, Pennsylvania, along the south Atlantic coast, in the Ohio and central Mississippi valleys, including western Tennessee and northern Arkansas.

The snowfall of the year was rather below the average and not well distributed.

THUNDERSTORMS.

The frequency of thunderstorm days in the different months and in the several States and Territories is shown approximately by the figures of Tables V and VI. The first-named table has been prepared from reports of both regular and voluntary observers with a view of showing the number of thunderstorm days recorded each month in the immediate neighborhood of the respective stations. The second table shows the number of days on which thunderstorms were recorded in the State or Territory as a whole. In preparing the last-named table reports from all stations whatsoever were used. The number of thunderstorm days for a given State, as shown in Table VI, depends largely upon the size of the State and the number and distribution of observing stations. In the District of Columbia, for example, with but one station, the number of thunderstorm days was 32, while for the adjacent State of Maryland, with an average of 58 stations, thunderstorms were observed on 120 days. In Virginia, with about 54 stations, the number of thunderstorm days was 123. The number of thunderstorms observed at a single station bears a fairly definite relation to the number that would be observed were it possible to greatly enlarge

TABLE A.—*Average monthly and annual departures of temperatures from the normal during* 1900.

Districts.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England	8	+ 2.1	− 0.2	− 1.6	+ 2.0	− 1.2	+ 0.8	+ 1.4	+ 2.0	+ 2.3	+ 4.7	+ 2.6	− 0.2	+ 1.3
Middle Atlantic	12	+ 2.2	− 1.8	− 2.2	+ 1.4	+ 0.8	+ 0.6	+ 2.5	+ 5.0	+ 4.8	+ 5.6	+ 4.3	+ 0.1	+ 2.0
South Atlantic	10	− 0.2	− 4.0	− 1.0	+ 0.6	+ 0.2	− 0.5	+ 1.3	+ 4.4	+ 3.8	+ 5.0	+ 3.0	− 0.8	+ 1.0
Florida Peninsula	7	− 2.2	− 3.0	− 1.5	0.0	+ 0.1	+ 0.1	+ 0.5	+ 1.7	+ 2.1	+ 3.6	+ 0.5	+ 0.3	+ 0.2
East Gulf	7	− 1.0	− 5.1	− 1.4	− 0.4	+ 0.8	− 1.1	− 0.4	+ 2.2	+ 4.0	+ 4.8	+ 2.5	− 0.3	+ 0.4
West Gulf	7	+ 3.4	− 8.1	+ 0.1	− 0.9	+ 0.6	+ 1.2	− 0.8	+ 1.2	+ 5.1	+ 3.9	+ 3.2	0.0	+ 1.1
Ohio Valley and Tennessee	11	+ 2.8	− 5.2	− 2.7	+ 0.4	+ 1.8	− 0.5	+ 0.9	+ 5.4	+ 5.7	+ 8.1	+ 2.0	+ 0.1	+ 1.6
Lower Lakes	8	+ 3.2	− 3.2	− 5.6	+ 1.9	+ 1.7	− 0.5	+ 0.6	+ 5.0	+ 3.6	+ 8.9	+ 2.2	0.0	+ 1.5
Upper Lakes	10	+ 6.6	− 4.3	− 3.4	+ 4.4	+ 3.4	− 0.7	− 0.8	+ 6.1	+ 2.9	+ 9.8	+ 0.2	+ 1.4	+ 2.1
North Dakota	8	+14.6	− 4.0	+ 0.8	+ 8.5	+ 6.4	+ 2.7	+ 0.1	+ 4.6	− 1.6	+ 5.4	− 3.6	+ 5.1	+ 3.2
Upper Mississippi Valley	11	+ 8.2	− 6.5	− 2.5	+ 3.1	+ 3.3	− 0.1	− 0.4	+ 7.0	+ 2.6	+ 8.8	+ 0.6	+ 1.5	+ 2.1
Missouri Valley	11	+10.1	− 4.3	+ 0.6	+ 3.7	+ 5.0	+ 1.5	− 0.2	+ 5.5	+ 1.2	+ 6.9	+ 0.2	+ 3.6	+ 2.9
Northern Slope	7	+13.5	− 1.3	+ 3.7	+ 2.9	+ 5.7	+ 5.9	− 0.4	+ 1.2	− 1.0	+ 3.3	− 0.5	+ 6.7	+ 3.3
Middle Slope	6	+ 8.8	− 2.0	+ 2.0	− 0.8	+ 2.2	+ 2.6	− 0.1	+ 3.6	+ 1.3	+ 4.8	+ 1.9	+ 1.9	+ 2.1
Southern Slope	6	+ 6.4	− 1.5	+ 1.0	− 2.3	− 1.9	+ 0.9	− 2.0	+ 1.0	+ 2.7	+ 2.6	+ 2.5	+ 1.0	+ 0.9
Southern Plateau	15	+ 6.7	+ 2.1	+ 4.7	− 4.1	+ 1.6	+ 0.7	+ 0.3	− 2.7	− 3.4	− 0.1	+ 2.9	+ 1.8	+ 0.9
Middle Plateau	9	+ 8.1	+ 4.3	+ 6.4	− 1.7	+ 2.2	+ 5.3	+ 0.7	− 3.1	− 3.7	− 0.5	+ 3.8	+ 3.6	+ 2.1
Northern Plateau	10	+10.0	+ 2.0	+ 6.6	− 1.4	+ 0.8	+ 5.2	− 0.2	− 4.9	− 1.4	− 0.5	− 1.2	+ 4.5	+ 1.6
North Pacific	7	+ 4.5	+ 3.4	+ 3.9	+ 1.1	− 0.4	+ 1.4	+ 0.3	− 1.7	− 0.3	− 0.9	− 0.7	+ 3.0	+ 1.1
Middle Pacific	5	+ 2.7	+ 2.1	+ 2.4	− 0.7	+ 0.8	+ 0.9	+ 0.5	− 0.9	0.0	− 0.8	+ 1.3	+ 0.4	+ 0.7
South Pacific	4	+ 4.0	+ 2.5	+ 3.8	− 2.2	+ 1.4	+ 1.7	+ 0.6	− 2.8	− 1.7	− 0.3	+ 4.6	+ 2.7	+ 1.2

TABLE B.—*Monthly and annual departures of precipitation from the normal during* 1900.

Districts.	Number of stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England	8	+0.4	+2.2	+0.3	−0.8	0.0	−1.2	−1.3	−1.6	−0.5	0.0	+0.3	−1.4	−3.9
Middle Atlantic	12	−1.0	+0.6	−0.3	−1.0	−0.9	+0.3	−1.2	−1.9	−1.0	−1.0	−0.1	−0.9	−7.8
South Atlantic	10	−0.9	+0.6	0.0	+1.6	−1.0	+1.3	−2.9	−4.2	−2.8	0.0	+0.9	+1.0	−6.6
Florida Peninsula	7	+0.5	+0.7	+3.7	+1.6	+0.3	+2.9	−1.6	−2.8	−1.4	+1.2	−1.6	+1.2	+4.7
East Gulf	7	−2.3	+3.0	−0.5	+3.7	−0.7	+7.9	−0.5	−2.9	0.0	+2.1	−0.6	+1.1	+9.5
West Gulf	7	−0.1	−0.9	+0.7	+1.2	−0.4	+0.1	+2.7	+0.7	−1.2	+1.0	−1.5	−1.0	+1.4
Ohio Valley and Tennessee	11	−1.6	−0.4	−1.7	−1.4	−0.8	+0.8	−0.8	−0.7	−1.0	0.0	+1.7	−1.6	−7.6
Lower Lakes	8	−0.1	+1.2	+0.4	−0.7	−1.6	−0.9	+1.6	−0.3	−1.0	−0.6	+0.9	−1.4	−2.6
Upper Lakes	10	−0.7	+0.4	−0.8	−0.6	−1.1	−1.7	+1.4	+0.9	+0.7	−0.8	0.0	−1.4	−3.7
North Dakota	8	−0.5	−0.2	+0.2	−1.2	−1.6	−2.4	−0.5	+3.2	+2.5	+0.6	+0.1	−0.3	−0.1
Upper Mississippi Valley	11	−0.6	+0.6	−0.5	−1.0	−0.5	−1.8	+1.2	+0.7	+1.5	+1.7	−0.4	−1.4	−0.3
Missouri Valley	11	−0.6	+0.3	−0.4	+0.3	−2.1	−0.8	+2.6	+0.9	+1.6	+1.3	−0.5	−0.8	+1.5
Northern Slope	7	−0.6	+0.2	−0.2	+2.2	−1.4	−1.6	−0.4	+0.2	+0.8	−0.3	−0.2	−0.2	−1.6
Middle Slope	6	−0.6	+0.2	−0.8	+3.1	−0.8	−1.2	0.0	−1.2	+2.0	+0.8	−0.3	−0.4	+0.7
Southern Slope	6	−0.6	−0.4	−0.3	+2.6	+0.3	−1.4	+2.0	−0.8	+5.4	+1.0	−0.1	−1.0	+6.7
Southern Plateau	15	−0.8	−0.7	−0.7	+1.2	0.0	−0.2	−0.7	−1.0	+0.8	−0.2	+0.9	−1.3	−2.7
Middle Plateau	9	−0.8	−0.3	−1.1	+0.7	−0.3	−0.3	−0.4	−0.4	+0.1	+0.1	+0.4	−1.2	−3.5
Northern Plateau	10	−1.0	−0.1	−0.6	+0.5	+0.6	−0.6	−0.3	−0.4	+0.1	+1.1	−0.4	−1.5	−2.6
North Pacific	7	−1.6	−0.7	+0.8	−2.2	+1.4	+2.0	−0.3	+0.3	−1.4	+1.9	−1.8	+1.5	−1.5
Middle Pacific	5	−0.6	−2.0	−1.7	−0.1	+0.1	+0.1	−0.1	0.0	−0.3	+1.6	+1.8	−3.2	−5.0
South Pacific	4	−1.4	−2.6	−1.0	−0.4	+1.3	−0.1	0.0	0.0	−0.1	0.0	+3.8	−2.9	−3.3

TABLE C.—*Monthly and annual departures of relative humidity from the normal*, 1900.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October	November.	December.	Annual.
New England	0	−1	−6	−1	−4	−5	−2	−2	−1	+7	+1	+1	−1.1
Middle Atlantic	0	−1	−2	−4	−7	−1	−2	−3	−1	+9	−2	+1	−1.1
South Atlantic	−3	−4	+1	0	−3	+3	−2	−6	−3	+7	−1	−1	−1.0
Florida Peninsula	0	−1	+2	+3	+3	−1	0	−2	0	+2	−4	+1	+0.2
East Gulf	−6	−5	−4	+1	−4	+8	+2	−3	−2	+11	−1	−2	−0.4
West Gulf	+2	−3	+3	+4	+4	+5	+8	+5	+6	+8	+2	+3	+3.9
Ohio Valley and Tennessee	−1	+2	+1	0	−6	+6	+2	0	−2	+6	0	+1	+0.8
Lower Lakes	−2	−2	0	−1	−2	−3	+3	+4	−2	+3	+2	−2	−0.2
Upper Lakes	+2	+3	+2	−2	−4	−3	+4	+6	+6	+7	+3	+3	+2.2
North Dakota	−2	−3	+2	−8	−9	−11	−9	+8	+14	+13	+2	+2	−0.1
Upper Mississippi Valley	+2	+3	+5	+1	0	−3	+4	+3	+4	+8	+2	+4	+2.8
Missouri Valley	−4	−3	−4	−2	−3	−6	0	+1	+6	+7	+1	−1	−0.7
Northern Slope	−1	+5	−3	+10	0	−3	0	+4	+12	+6	+3	+2	+2.9
Middle Slope	+1	0	+1	+14	+6	+2	−1	−5	+8	+6	+1	−2	+2.6
Southern Slope	+6	−11	+4	+13	+10	−2	+6	0	+10	+10	+4	−13	+3.1
Southern Plateau	−8	−15	−5	+8	+1	−1	−8	−17	−8	−8	−6	−9	−6.3
Middle Plateau	−1	−10	−15	+9	−8	−9	−10	−5	+3	+2	+5	−4	−3.6
Northern Plateau	−1	−4	−5	+8	+1	−4	−6	+3	+4	+4	+7	+2	+0.8
North Pacific	0	−2	−2	−5	−2	−3	−6	−3	−3	−3	−1	−1	−2.6
Middle Pacific	+6	0	−1	−4	−5	+2	−10	−5	−4	+2	+6	−4	−1.4
South Pacific	+5	−2	−3	+1	+1	+2	0	+4	−5	0	−3	−8	−0.7

TABLE D.—*Monthly and annual departures of average cloudiness from the normal*, 1900.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
New England	+0.1	+0.5	−0.8	0.0	0.0	−0.4	−0.2	−0.3	0.0	+0.9	+1.4	−0.1	+0.1
Middle Atlantic	−0.1	+0.3	−0.1	−0.3	−0.4	+0.5	−0.5	−1.1	−0.3	+0.9	+0.9	+0.1	0.0
South Atlantic	−0.8	+0.5	+0.5	+0.4	−0.8	+0.9	−0.6	−2.0	−1.7	+1.2	0.0	+0.4	0.0
Florida Peninsula	+1.0	+0.2	+1.3	+0.7	+1.5	0.0	+0.1	+0.1	−0.4	+1.0	−0.3	+1.7	+0.6
East Gulf	−0.6	+0.1	+0.8	+0.6	−0.4	+1.8	+0.8	−0.5	−1.3	+2.0	0.0	+0.4	+0.3
West Gulf	+0.2	−0.4	+0.6	+0.6	+0.1	−0.2	+1.5	+0.2	+0.3	+0.9	−0.2	−0.4	+0.3
Ohio Valley and Tennessee	−0.5	+0.7	+0.2	−0.4	−0.4	+1.0	−0.2	−0.8	0.0	0.0	0.0	−0.2	0.0
Lower Lakes	+0.2	+0.4	0.0	−0.5	+0.3	−0.2	+0.5	−0.1	+0.2	−0.9	+0.7	+0.4	+0.1
Upper Lakes	+0.4	−0.1	+0.3	−0.4	+0.4	−0.7	+0.6	+0.7	+0.6	−0.5	+0.7	+0.5	+0.2
North Dakota	−0.2	+0.4	+0.1	−1.7	−1.6	−1.5	−0.7	0.0	+1.2	−0.5	−0.3	−0.1	−0.4
Upper Mississippi Valley	+0.1	+0.6	0.0	−0.4	−0.3	−0.3	−0.2	−0.3	+0.6	+0.1	+0.3	−0.1	0.0
Missouri Valley	−0.4	+0.4	−0.7	+0.6	−0.8	−0.4	−0.5	−0.2	+0.7	−0.2	+0.1	+0.1	−0.1
Northern Slope	−0.2	+1.2	−0.3	+0.2	−0.8	−1.0	−0.3	+0.7	+0.6	+0.1	+0.3	+0.2	+0.1
Middle Slope	0.0	+0.3	+0.1	+1.6	0.0	+0.1	−0.4	−0.2	+1.5	+1.0	+0.6	+0.1	+0.4
Southern Slope	0.0	−0.8	+0.8	+0.6	−0.1	−1.6	+0.4	−1.6	+0.9	+1.2	−0.4	−1.8	−0.2
Southern Plateau	0.0	−0.7	+0.4	+0.9	+0.1	+0.4	−1.3	−1.2	+0.7	+0.6	+0.3	−1.4	−0.1
Middle Plateau	−0.2	+0.7	−1.2	+2.2	−0.1	+0.3	+0.2	+0.6	+0.9	+1.2	+1.2	−0.7	+0.4
Northern Plateau	−0.9	+0.4	−1.1	0.0	−0.1	−1.0	−0.6	+1.5	+0.5	+0.8	+0.6	+0.5	0.0
North Pacific	−0.2	+0.6	−0.2	−0.9	+0.8	−0.1	−0.4	+1.4	+0.3	+1.1	−0.3	+0.4	+0.2
Middle Pacific	+1.6	+0.2	+0.4	−0.3	−0.3	+1.2	−0.4	+0.5	+0.6	+1.3	+2.2	+0.3	+0.5
South Pacific	+1.4	−1.2	−0.3	0.0	−1.1	+0.3	+0.1	+0.7	−0.3	+0.5	+0.3	−0.6	0.0

the field of observation. The ratio for Washington, D. C., is about 4.0, that is to say, in order to ascertain the number of thunderstorm days for a region equal in area to the adjoining States of Maryland and Virginia we have only to multiply the number observed at Washington by the constant 4.0.

Thunderstorms were reported on a greater number of days in 1900 than in the preceding year. The increase was most marked on the Pacific coast, in Texas, Arkansas, Louisiana, Oklahoma, Indian Territory, and the eastern foothills of the Rocky Mountains. The States and Territories in which the number of thunderstorm days reported in 1900 was less than in the preceding year are Arizona, District of Columbia, Maryland, Virginia, Ohio, Tennessee, West Virginia, Indiana, and South Dakota. The number of voluntary stations reporting thunderstorms in each of the several States is substantially the same as in the preceding year.

SPECIAL CONTRIBUTIONS.

FRESHETS IN JAMES RIVER, VA.

By E. A. EVANS, Section Director, reprinted from Annual Summary.

The accompanying tables, showing flood heights and rate of flood travel in the James River, have been given in this report in pursuance of a plan which has for its end the collection and preservation in a permanent and accessible form of all matter relating to the floods of this stream. In previous annual reports some space has been devoted to an elementary consideration of the same subject, and the data now given are only to be considered as supplementary thereto.

Freshet record of James River, May 4, 1893, to October 2, 1896.

Date.	Highest stages of river (feet and tenths) during freshets.								
	Cliftonforge.	Eagle Mountain.	Buchanan.	Balcony Falls.	Lynchburg.	Scottsville.	Columbia.	9-Mile Locks.	Richmond at Rocketts.
1893.									
Time...	10.30 a.m.	11 a.m.	11 a.m.	5.30 p.m.	6.30 p.m.	12 midn't	1 a.m.	3 p.m.	4 p.m.
May 4....	10.5	12.3	15.0	13.3	13.9	17.8			
May 5....							26.9	10.1	16.9
Time...	4 p.m.	4 p.m.	8 a.m.	4 p.m.	6 p.m.	6 a.m.	7 a.m.	1 a.m.	2 a.m.
Sept. 12..	2.0	3.9							
Sept. 13..			7.7	7.0	10.8				
Sept. 14..						14.9	24.0		
Sept. 15..								8.1	14.6
1895.									
Time...					8 p.m.	8 a.m.	4 p.m.	2 p.m.	5 p.m.
Jan. 10...					10.5				
Jan. 11...						18.4	28.3		
Jan. 12...								10.7	18.2
Time...	8 p.m.		12 midn't	12 midn't	2 a.m.	7 p.m.	8 a.m.	6 p.m.	8 p.m.
Apr. 8....	15.9		19.0	11.0					
Apr. 9....					15.2	19.2			
Apr. 10...							25.5	9.4	16 4
Time..	8 a.m.	4 p.m.	4 p.m.		8 p.m.	4 p.m.	4 p.m.	2 p.m.	5 p.m.
July 9....	9.0	9.0	12.1		10.2				
July 10...						14.2	19.3		
July 11...								7.4	12.5
1896.									
Time...					10 p.m.		10 a.m.	1 a.m.	4 a.m.
Sept. 30..					15.7				
Oct. 1....							28.5		
Oct. 2....								10.8	16.7

NOTE.—None of the heights given in this table are referred to the Weather Bureau river gages. Data given have not been verified.

It is unfortunate that the importance of preserving detailed information of each flood was not recognized many years before it appears to have been, and that when recognized a more determined effort was not made to keep it complete from year to year. Work of this nature is necessarily largely voluntary work, and hence the thoroughness of its performance depends upon the amount of personal interest each cooperating individual has. It is, doubtless, owing to the importance of the work being not understood that the record at a number of points is of so fragmentary a nature as to be well nigh useless for the purposes of reference or study. But nevertheless it is given, not only to preserve it in whatever measure of completeness it does possess, but also in the hope that at some future day it may be added to by some more successful person.

Comparison of Freshets.

Place.	Date.	Time.	Height, in feet.	Excess above, May 5.		Interval, Columbia to Richmond.
				Columbia.	Richmond.	
				Feet.	*Feet.*	*Hrs.*
Columbia	May 5, 1893	1 a. m.	26.9	0.00		15
Richmond	do	4 p. m.	16.9		0.00	
Columbia	Sept. 14, 1893.	7 a. m.	24.0	−2.90		19
Richmond	Sept. 15, 1893.	2 a. m.	14.6		−2.27	
Columbia	Jan. 11, 1895.	4 p. m.	28.3	+1.40		25
Richmond	Jan. 12, 1895.	5 p. m.	18.2		+1.29	
Columbia	April 10, 1895.	8 a. m.	25.5	−1.40		12
Richmond	do	8 p. m.	16.4		−0.52	
Columbia	July 10, 1896.	4 p. m.	19.3	−7.60		25
Richmond	July 11, 1896.	5 p. m.	12.5		−4.38	
Columbia	Oct. 1, 1896.	10 a. m.	28.5	+1.60		18
Richmond	Oct. 2, 1896.	4 a. m.	16.7		−0.20	

Place.	Date.	Time.	Height, in feet.	Excess above, May 4, Lynchburg.	Excess above, May 5, Richmond.	Interval, Lynchburg to Richmond.
Lynchburg	May 4, 1893.	6:30 p. m.	13.9	0.00		
Richmond	May 5, 1893.	4:00 p. m.	16.9		0.00	21.5
Lynchburg	Sept. 13, 1893.	6:00 p. m.	10.8	−3.10		32
Richmond	Sept. 15, 1893.	2:00 a. m.	14.6		−2.27	
Lynchburg	Jan. 10, 1895.	8:00 p. m.	10.5	−3.40		45
Richmond	Jan. 12, 1895.	5:00 p. m.	18.2		+1.29	
Lynchburg	April 9, 1895.	2:00 a. m.	15.2	+1.30		42
Richmond	April 10, 1895.	8:00 p. m.	16.4		−0.52	
Lynchburg	July 9, 1896.	8:00 p. m.	10.2	−3.70		45
Richmond	July 11, 1896.	5:00 p. m.	12.5		−4.38	
Lynchburg	Sept. 30, 1896	10:00 p. m.	15.7	+1.80		30
Richmond	Oct. 2, 1896.	4:00 a. m.	16.7		−0.20	

Height given at Richmond is above mean low tide, which is 10.179 feet above the United States Engineer datum. Height given at all other points is above ordinary low water known or assumed.

Rise at Richmond is 59 to 65 per cent of that at Columbia. Difference in time of maximum rise at Columbia and Richmond is twelve to twenty-five hours.

Rise at Richmond is 65 to 73 per cent greater than at Lynchburg. Difference in time of maximum rise at Lynchburg and Richmond is twenty-one and a half to forty-five hours.

The Weather Bureau, by the thoroughness of its methods, has solved many fluvial problems, and has perfected a flood warning system that is of immense value to the people in times of high water. A notable instance of this may be found in the great flood occurring in the lower Mississippi Valley in the spring of 1897, when all forecasts of expected flood heights were verified on the days named with astonishing accuracy. Truly, if the guarantee for the future lies in the progress of the past, we shall at no distant day find in this a work of noble and impressive proportions.